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AMENDMENTS

In the Claims

Status of Claims

1 1.**(currently amended)** An apparatus for condensing multi-component fluids comprising:
2 a plurality of heat exchange stages,
3 at least one scrubber is adapted to receive at least one input liquid stream and at least one
4 input vapor stream and produce at least one output liquid stream and at least one output vapor
5 stream, and
6 a plurality of mixers and splitters,
7 where ~~the heat exchange stages and~~ the at least one scrubber and the mixers and the splitter
8 are configured to form ~~are interconnected in such a way that streams are split and mixed so that~~ a
9 ~~mixed~~ partially condensed stream derived from a vapor multi-component feed stream for ~~enters~~ each
10 heat exchange stage, where each partially condensed stream has parameters adapted to increase
11 ~~increasing~~ a heat transfer coefficient in each of the heat exchange stages, where the heat exchange
12 stages are adapted to fully condense its partially condensed stream, and where a last heat exchange
13 stage is adapted to produce a fully condensed multi-component output stream.

1 2.**(original)** The apparatus of claim 1, where the plurality of heat exchange stages is two.

1 3.**(original)** The apparatus of claim 1, where the plurality of heat exchange stages is three.

1 4.**(original)** The apparatus of claim 1, where the plurality of heat exchange stages is four.

1 5.**(original)** The apparatus of claim 1, where the plurality of heat exchange stages is more than
2 four.

1 6.**(currently amended)** The apparatus of claim 1, further comprising a plurality of scrubbers,
2 where the scrubber plurality is equal to or one less than the plurality of heat ~~exchanger~~ exchange
3 stages.

1 7.**(currently amended)** The apparatus of claim 6, where the heat exchange stage plurality is
2 three and the scrubber plurality is two.

8.**(original)** The apparatus of claim 1, wherein the exchange stages are heat exchangers.

9.**(currently amended)** An apparatus for condensing multi-component fluids comprising:

a first plurality of heat exchange stages,

a second plurality of scrubbers are adapted to receive at least one input liquid stream and at least one input vapor stream and produce at least one output liquid stream and at least one output vapor stream,

a third plurality of mixers, and

a fourth plurality of splitters,

where ~~the heat exchange stages and the scrubbers are interconnected in such a way that streams are split and mixed so that a mixed stream enters each heat exchange stage increasing a heat transfer coefficient in each of the heat exchange stages~~ the scrubbers, the mixers and the splitter are configured to form a partially condensed stream derived from a vapor multi-component feed stream for each heat exchange stage, where each partially condensed stream has parameters adapted to increase a heat transfer coefficient in each of the heat exchange stages, where the heat exchange stages are adapted to fully condense its partially condensed stream, and where a last heat exchange stage is adapted to produce a fully condensed multi-component output stream.

10.**(currently amended)** The apparatus of claim ~~1~~9, where the plurality of heat exchange stages is two.

11.**(currently amended)** The apparatus of claim ~~1~~9, where the plurality of heat exchange stages is three.

12.**(currently amended)** The apparatus of claim ~~1~~9, where the plurality of heat exchange stages is four.

13.**(currently amended)** The apparatus of claim ~~1~~9, where the plurality of heat exchange stages is more than four.

14.**(currently amended)** The apparatus of claim ~~1~~9, further comprising a plurality of scrubbers,

where the scrubber plurality is equal to or one less than the plurality of heat ~~exchanger~~ exchange stages.

15.**(currently amended)** The apparatus of claim ~~6~~14, where the heat exchange stage plurality is three and the scrubber plurality is two.

16.**(currently amended)** The apparatus of claim ~~1~~9, wherein the exchange stages are heat exchangers.

17.**(currently amended)** A process for condensing multi-component fluids comprising the steps of:

~~feeding an input vapor stream comprising a multi-component fluid to a condensation system of claims 1-16;~~

splitting ~~the~~ an input vapor stream into first and second vapor sub-streams;

forwarding the first vapor sub-stream to a lower port of a scrubber;

combining the second vapor sub-stream with a first scrubber liquid stream from a bottom port of the scrubber to form a first mixed stream;

passing the first mixed stream through a first heat exchanger where it is fully condensed forming a first condensed stream;

splitting the first condensed stream into first and second condensed sub-streams;

combining the second condensed sub-stream with a first scrubber vapor stream from an upper port of the first scrubber to form a second mixed stream;

forwarding the first condensed sub-stream to a top port of a ~~the~~ scrubber;

counterflow compositionally equilibrating the first vapor sub-stream and the first condensed sub-stream in the scrubber, and

passing the second combined stream through a second heat exchanger where it is fully condensed forming a final liquid stream comprising a multi-component stream having a compositions the same or substantially the same as the input stream,

where the streams entering each heat exchanger are mixed streams having a composition designed to increase, optimize or maximize a heat transfer coefficient in each heat exchanger.

18.**(original)** The process of claim 17, further comprising the steps of:

before the second splitting step, combining the first condensed stream with a second scrubber vapor stream from a port in a middle section of the scrubber to form a third mixed stream,

passing the third mixed stream through a third heat exchanger where it is fully condensed forming a second condensed stream.

19.**(original)** The process of claim 17, further comprising the steps of:

before the second splitting step, splitting the first condensed stream into third and forth condensed sub-streams,

forwarding the forth condensed sub-stream to a port in a middle section of the scrubber;

combining the third condensed sub-stream with a second scrubber vapor stream from a port in the middle section of the scrubber to form a third mixed stream,

passing the third mixed stream through a third heat exchanger where it is fully condensed forming a second condensed stream.

20.**(original)** The process of claim 17, further comprising the steps of:

before the second splitting step, combining the first condensed stream into second scrubber liquid stream from a port in a middle section of the scrubber to form a third combined stream,

combining the third combined stream with a second scrubber vapor stream from another port in the middle section of the scrubber to form a third mixed stream,

passing the third mixed stream through a third heat exchanger where it is fully condensed forming a second condensed stream.

21.**(currently amended)** A process for condensing multi-component fluids comprising the steps of:

~~feeding an input vapor stream comprising a multi-component fluid to a condensation system of claims 1-16;~~

splitting the input vapor stream into first and second vapor sub-streams;

forwarding the first vapor sub-stream to a lower port of a first scrubber;

combining the second vapor sub-stream with a first scrubber liquid stream from a bottom port of a second scrubber to form a first mixed stream;

passing the first mixed stream through a first heat exchanger where it is fully condensed forming a first condensed stream;

combining the first condensed stream with a first scrubber vapor stream from a port in a middle section of the first scrubber to form a second mixed stream,

passing the second mixed stream through a second heat exchanger where it is fully condensed forming a second condensed stream

splitting the second condensed stream into first and second condensed sub-streams;

combining the second condensed sub-stream with a second scrubber vapor stream from an upper port of the second scrubber to form a third mixed stream;

forwarding the first condensed sub-stream to a top port of the first scrubber;

forwarding a second scrubber liquid stream from a bottom port of the first scrubber to a top port of the second scrubber,

forwarding a third scrubber vapor stream from an upper port of the first scrubber to a lower port of the second scrubber,

counterflow compositionally equilibrating the first vapor sub-stream and the first condensed sub-stream in the first scrubber,

counterflow compositionally equilibrating the second scrubber liquid stream and the third scrubber vapor stream in the second scrubber, and

passing the third mixed stream through a third heat exchanger where it is fully condensed forming a final liquid stream comprising a multi-component stream having a compositions the same or substantially the same as the input stream,

where the streams entering each heat exchanger are mixed streams having a composition designed to increase, optimize or maximize a heat transfer coefficient in each heat exchanger.

22.**(original)** The process of claim 21, further comprising the steps of:

before the second splitting step, combining the first condensed stream with a second scrubber vapor stream from a port in a middle section of the scrubber to form a third mixed stream,

passing the third mixed stream through a third heat exchanger where it is fully condensed forming a second condensed stream.

23.**(original)** The process of claim 21, further comprising the steps of:

before the second splitting step, splitting the first condensed stream into third and forth condensed sub-streams,

forwarding the forth condensed sub-stream to a port in a middle section of the scrubber;

combining the third condensed sub-stream with a second scrubber vapor stream from a port in the middle section of the scrubber to form a third mixed stream,

passing the third mixed stream through a third heat exchanger where it is fully condensed forming a second condensed stream.

24.**(original)** The process of claim 21, further comprising the steps of:

before the second splitting step, combining the first condensed stream into second scrubber liquid stream from a port in a middle section of the scrubber to form a third combined stream,

combining the third combined stream with a second scrubber vapor stream from another port in the middle section of the scrubber to form a third mixed stream,

passing the third mixed stream through a third heat exchanger where it is fully condensed forming a second condensed stream.

25.**(new)** An apparatus for condensing multi-component fluids comprising:

a first splitter valve adapted to receive a multi-component vapor feed stream and to form a first vapor feed sub-stream and a second vapor feed sub-stream,

a scrubber apparatus adapted to receive the first vapor feed sub-stream at a lower port and a first portion of a first condensed stream in a top port and to produce a liquid scrubber stream at a bottom port and a vapor scrubber stream at an upper port,

a first mixer valve adapted to combine the second vapor feed sub-stream and the liquid scrubber stream to form a first combined stream,

a first heat exchange stage adapted to fully condense the first combined stream to form a first condensed stream, where the first combined stream has parameters adapted to increase a heat transfer coefficient of the first heat exchanger,

a second splitter valve adapted to divide the first condensed stream into two portions,

a second mixer valve adapted to combine a second portion of the first condensed stream and the vapor scrubber stream to form a second combined stream,

a second heat exchanger adapted to fully condense the second combined stream to form a fully condense multi-component output stream, where the second combined stream has parameters adapted to increase a heat transfer coefficient of the second heat exchanger.

26.**(new)** The apparatus of claim 25, wherein the scrubber apparatus includes a single scrubber.

1 28.(new) The apparatus of claim 25, wherein the scrubber apparatus includes two scrubbers.

28.(new) An apparatus for power generation comprising:

a vaporization unit adapted to fully vaporize a fully condensed multi-component working fluid stream into a fully vaporized multi-component working fluid stream;

an energy extraction unit adapted to convert a portion of thermal energy in the fully vaporized multi-component working fluid stream and to produce a spent multi-component working fluid stream,

a condensation unit including:

a plurality of heat exchange stages,

at least one scrubber, and

a plurality of mixers and splitters,

the at least one scrubber, the mixers and the splitter are configured to form a partially condensed stream derived from a vapor multi-component feed stream for each heat exchange stage, where each partially condensed stream has parameters adapted to increase a heat transfer coefficient in each of the heat exchange stages, where the heat exchange stages are adapted to fully condense its partially condensed stream, and where a last heat exchange stage is adapted to produce a fully condensed multi-component output stream.